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Evaluation # 200407-I

Safety & Buildings Division
201 West Washington Avenue
P.O. Box 2658
Madison, WI 53701-2658

Wisconsin
Building Products Evaluation

Material	Insulated Concrete Wall System
Manufacturer	REDDI-WALL Inc. 1075 Rochester Road Oakland, MI 48363

SCOPE OF EVALUATION

GENERAL: This report evaluates the use of the REDDI-WALL Insulated Concrete Form Wall System, manufactured by REDDI-WALL Inc., evaluated as permanent form work and insulation system for reinforced concrete beams, lintels, exterior and interior walls, and foundation and retaining walls. The REDDI-WALL Insulated Concrete Form Wall System was evaluated for safety requirements of the foam plastic and structural requirements for the codes listed below.

The **Comm** code requirements below in accordance with the current **Wisconsin Uniform Dwelling Code for 1 & 2 family dwellings:**

- **Foam Plastic:** The REDDI-WALL Insulated Concrete Form Wall System was evaluated in accordance with the fire safety requirements of **s. Comm 21.11**.
- **Structural:** The REDDI-WALL Insulated Concrete Form Wall System was evaluated in accordance with the structural requirements of **ss. Comm 21.02,** and **21.02(3)(c)**.

The **IBC** requirements below in accordance with the **Wisconsin Amended ICC Code:**

- **Foam Plastic:** The REDDI-WALL Insulated Concrete Form Wall System was evaluated in accordance with the fire safety requirements **ss. IBC 2603.1**, **2603.2**, and **2603.3**.
- **Structural:** The REDDI-WALL Insulated Concrete Form Wall System was evaluated in accordance with the requirements of **IBC Chapter 16**.
- **Fire Endurance:** The REDDI-WALL Insulated Concrete Form Wall System was evaluated in accordance with the requirements of **ss. IBC 2603.4**, **2603.5.1**, and **2603.5.2**.

- **Fire-Resistance Rating and Fire Tests:** The REDDI-WALL Insulated Concrete Form Wall System was evaluated in accordance with the requirements of **ss. IBC 703.1** and **703.2 [Comm 62.0703]**.

Note: Structural calculations shall be submitted (job-to-job basis) in accordance with IBC Chapter 16 for Live, Ground Snow, Roof, Wind, and Seismic Loads.

DESCRIPTION AND USE

General: REDDI-WALL Insulated Concrete Form Wall System consists of expanded polystyrene (EPS) forms (a one-piece unit block). The blocks are stacked in running bond. The end, straight, and corner blocks are 10-inches thick, 60 inches long and 12 inches high. The brick ledge footing block is 10-inches thick, 40 inches long and 12 inches high. The brick ledge corner block is 17-inches thick, 17 inches long and 12 inches high. The EPS forms remain in place to provide insulation for the wall. The reinforced concrete wall system may be used as a foundation wall, basement wall, shear wall, exterior load-bearing wall, brick ledge footing block and lintel section.

Footing System: REDDI-WALL Insulated Concrete Form Wall System can be installed on:

- Standard concrete footings with #4 vertical rebar, drilled or cast-in-place every 20" or, a deep trench footing,
- Virgin earth or,
- 4 inches minimum of pea stone.

Foundation Drainage System: REDDI-WALL Insulated Concrete Form Wall System can be used in conjunction with a:

- Conventional pipe and gravel system or,
- Form-A-Drain system.

Material: REDDI-WALL Form Blocks are molded from modified expandable polystyrene beads. Manufacturer include:

Product	Manufacturer
Grade 54	Huntsman Chemical Corporation
Grade 40	Huntsman Chemical Corporation

The Grade 54 blocks are manufactured to a nominal density of 1.75 pounds per cubic foot.
The Grade 40 blocks are manufactured to a nominal density of 2.00 pounds per cubic foot.

Concrete: Normal-weight concrete complying with **s. Comm 21.02(3)(b)**, and **s. IBC 1903.1** with maximum aggregate size of 3/4 inch and a minimum compressive strength of 2,500 psi.

Reinforcement: The concrete is reinforced with Nos. 3, 4, and 5 deformed steel reinforcing bars, Type A615, Grade No. 40, with a minimum yield strength of 40,000 psi. All steel reinforcement shall be in accordance with **s. IBC 1903.5**.

Each pallet of REDDI-WALL forms shall bear a label with the manufacturer's name, and the quality control inspection agency.

TESTS AND RESULTS

The tests and results listed below cover both the current WI Building Code **Comm** and future **IBC** requirements:

The REDDI-WALL insulated concrete forms produced by REDDI-WALL Inc., have been subject to and complied with the following testing:

- Huntsman Chemical Grades 54 and 40 EPS has a flame-spread rating not exceeding 25 and a smoke-developed rating not exceeding 450 (up to 5 inches in thickness). Testing was done in accordance with ASTM E 84 (see NES Report No. NER-384).
- Intertek Testing Services conducted testing on the REDDI-WALL forms. Meets 2-hour fire rating in accordance with ASTM E119 and CAN/ULC S101.

LIMITATIONS OF APPROVAL

The **Comm** limitations below are in accordance with the current **Wisconsin Uniform Dwelling Code, for 1 & 2 family dwellings:**

- **Foam Plastic:** The REDDI-WALL ICF wall system is approved for use with a thermal barrier to separate the blocks from interior spaces in accordance with **s. Comm 21.11(1)**. Where a 1-inch thickness of masonry does not separate the polystyrene blocks from the building interior, including at the top of the wall, a thermal barrier, which has a finish rating of at least 15 minutes, shall be provided.

1. REDDI-WALL form blocks are approved for use in combustible non-rated construction in accordance with **s. Comm 21.11**. In one- or two-family dwellings, thermal barriers shall be provided to separate the forms from the occupied space of the dwellings per **s. Comm 21.11**.
2. The exterior face of the blocks shall be finished with an approved weather covering and must be protected from ultraviolet light.

- **Structural:** The REDDI-WALL form blocks are approved as structural building elements.

1. The units are approved for use as concrete forms for basement walls and exterior walls when the resulting concrete core thickness satisfies **Table 21.18-A** for one- or two-family dwellings, or when structural calculations for the product are submitted for review.
2. Walls shall be anchored to all floors and roofs. Walls shall be interconnected at corners by embedding and lapping the reinforcement.
3. Structures are **limited** to two stories in height.
4. The forms are approved for use as concrete forms for basement walls , exterior walls and retaining walls when structural calculations are submitted to the department by a Wisconsin registered professional engineer or architect.
5. Below grade walls shall be damp-proofed when required by the local building department.
6. Damp-proofing and water-proofing materials shall be approved by REDDI-WALL Inc., and the local building official, and shall be free of solvents that will adversely affect the EPS foam.

NOTE: The REDDI-WALL ICF wall system was **not** evaluated for compliance with the thermal requirements of **Subchapter VI, ss. Comm 22.20**, **22.21**, **22.23**, **22.25**, **22.27**, **22.28**, and **22.31** of the current **Wisconsin Uniform Dwelling Code, for 1 & 2 family dwellings**.

The **IBC** limitations below are in accordance with the current **Wisconsin Amended ICC Code:**

- **Foam Plastic:** The REDDI-WALL wall system is approved for use with a thermal barrier to separate the blocks from interior spaces in accordance with **s. IBC 2603.4.**

1. In accordance with **s. IBC 2603.4.1.6**, when the REDDI-WALL is used within the attic or crawl space where entry is made only for service utilities, the foam plastic insulation shall be protected against ignition by 1-1/2" thick mineral fiber insulation, a ¼" thick wood structural panel, particleboard or hardboard, gypsum wallboard, corrosion-resistant steel or other approved material installed so that the foam plastic is not exposed.
2. The protective covering shall be consistent with the requirements for the type of construction.
3. The exterior face of the blocks shall be finished with an approved weather covering and must be protected from ultraviolet light.

4. The crawl space shall not be used for storage or air handling purposes, there are no interconnected basement areas and entry to the crawl space is only for service of utilities.

- **Structural:** Design of concrete formed by REDDI-WALL forms must comply with **IBC Chapter 19** with the following requirements:

1. The forms are approved for use as concrete forms for basement walls , exterior walls and retaining walls when structural calculations are submitted to the department by a Wisconsin registered professional engineer or architect.
2. Design calculations of walls must comply with **s. IBC 1901.2.** Use of the empirical design approach specified in **s. 2109.1 [Comm 62.2109(1)]** is prohibited.
3. Design of lintels shall comply with the applicable provisions of **IBC Chapter 16.**
4. Wall loading shall be in accordance with **IBC Chapter 16**.
5. Minimum wall reinforcement shall conform to **s. IBC 1901.2**. When the code requires that vertical and horizontal reinforcement be spaced no further apart than 18 inches or three times the wall thickness, whichever is less, the maximum concrete wall thickness along the length of the wall is permitted to be used to determine rebar spacing.
6. Walls shall be anchored to floors and roofs in accordance with **s. IBC 1604.8.2**. Walls shall be interconnected at corners by embedding and lapping reinforcement in accordance with the code.
7. Design of shear walls shall be in accordance with **ss. IBC 1901.2** and **1910**.
8. Structures are **limited** to two stories in height plus a basement.
9. Below grade walls shall be damp-proofed when required by the local building department, water-proofed in accordance with **s. IBC 1806**.
10. Damp-proofing and water-proofing materials shall be approved by REDDI-WALL Inc., and the local building official, and shall be free of solvents that will adversely affect the EPS foam.
11. Special inspection is required as noted in **s. IBC 1704**, for placement of reinforcing steel and concrete, and for concrete cylinder testing, except that special inspection is not required for foundation stem walls conforming to **Table 1805.4.2** of the **IBC**. Additionally, when the building official approves, special inspection is not required when all of the following conditions are met:

    a) Wall systems are a maximum of 8 feet high and are limited to use in single-story construction of Group R-3, or Group U Occupancies.
    b) Maximum height of a concrete pour is 48 inches. Succeeding lifts must be placed in accordance with **s. IBC 1905.10.**
    c) Installation is by properly trained installers approved by REDDI-WALL Inc.
    d) The installation instructions indicate methods used to verify proper placement of concrete.
12. Walls constructed with REDDI-WALL insulated concrete form blocks is considered Type V Construction.

Alternate Design: In lieu of calculations, the structural design of reinforced concrete formed by REDDI-WALL Insulated Concrete Form Wall System insulated concrete form blocks for residential construction is permitted to comply with the *Prescriptive Method for Insulating Concrete Forms in Residential Construction* (publication No. EB118), dated May 1998, published by the Portland Cement Association (PCA). Buildings constructed with the REDDI-WALL Insulated Concrete Form Wall System insulated concrete form system and designed in accordance with the alternate design, will not exceed a height of two stories plus a basement, where the maximum unsupported wall height is 10 feet.

NOTE: The REDDI-WALL Insulated Concrete Form Wall System was **not** evaluated for compliance with the thermal requirements of **s. Comm 63.1018**.

Identification: Each package bears a label specifying the name and address of the manufacturer REDDI-WALL Inc. Additionally, product labels indicate the Wisconsin Building Product Evaluation Number (**200407-I**), and the name and logo of the quality control agency.
This approval will be valid through December 31, 2009, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The product approval is applicable to projects approved

under the current edition of the applicable codes. This approval may be void for project approvals made under future applicable editions. The Wisconsin Building Product Evaluation number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Revision Date:
Approval Date: April 1, 2004 By: _____

Lee E. Finley, Jr.
Product & Material Review
Integrated Services Bureau

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